US Environmental Protection Agency (USEPA) Review of the
Draft Report Final Status Survey: Ship Berths 14, 21, 22, and 29
Hunters Point Naval Shipyard, July 2017
Comments dated November, 2017

GENERAL COMMENTS

1. The Draft Report Final Status Survey: Ship Berths 14, 21, 22, and 29 (the FSS) Section 5.6 (Surveys of Remaining Ship Berth Structures) does not provide sufficient justification for statements that alpha contamination of ship berth structures is not site-related. The text states that ship berth structures, such as concrete infrastructure, bollards, and cleats were surveyed and that elevated alpha activity was encountered which could not be explained by radon and was not suspected to be from contamination. However, the statement that the elevated alpha activity is not site related is not supported by the information provided in the FSS. In general, the text and appendices in the FSS do not provide adequate documentation of the activities involving radiological surveys of ship berth structures that would support a conclusion that the release criteria have been met, as follows:

- The text does not list the various remaining ship berth structures surveyed or provide results for each survey. Therefore, there is a large documentation gap in the FSS with respect to the activities conducted to survey structures at the Ship Berths 14, 21, 22, and 29. Additional information about the results of surveys of other Ship Berths structures should be provided and discussed in the FSS. For example, it is unclear if there are other metal structures that also had elevated alpha counts.

- The text states that the elevated alpha activity was found consistently on or near heavily weathered (i.e., rusted) metal surfaces. A single composite sample of metallic shavings, rust particles, and paint scraped from bollards was analyzed. The text also states that laboratory results indicated that neither Radium-226 (Ra-226) nor Plutonium-230 (Pu-239) were present and that the only alpha-emitting radionuclide detected above the Minimum Detectable Concentration (MDC) was polonium-210 (Po-210). However, only one sample was analyzed in the laboratory using gamma and alpha spectroscopy analyses. The analysis of a single metal shavings/rust particles/paint sample, using gamma spectroscopy does not provide sufficient evidence to support a conclusion that the elevated alpha activity was not from Ra-226 and is not site-related. Further, the FSS did not discuss or provide information regarding the gamma and alpha spectroscopy analysis requirements or quality control parameters used to analyze the sample. Therefore, it is not clear if the analysis was representative of site conditions. For example, the FSS does not state if the sample was collected in a sealed container and counted after a 21-day in-growth time or how the analytical instrumentation was calibrated to account for the complex matrix/geometry of the sample for the gamma spectroscopy analysis. It is also unclear how the sample was prepared for the alpha spectroscopy analysis, such as whether the entire sample was digested

and whether there were any interferences encountered in the alpha spectroscopy analysis that would affect or bias the results. As such, the defensibility of the analysis results and conclusions are not supported by the information provided in the FSS.

- The text states that the Po-210 accounted for eighty percent of the gross alpha activity detected, which justified applying an eighty percent correction factor to the total removable alpha surface activity to conclude that the site meets the release criteria of less than 100 disintegrations per minute (dpm) per 100 centimeters squared (cm2) removable alpha activity. However, because insufficient information exists to support that the laboratory result is representative of all structures and meets a defined set of analysis parameters and quality control, the conclusion regarding use of an eighty percent correction factor to justify that the site meets the release criteria for removable gross alpha activity, is not supported.

- Section 5.6 references a technical memorandum provided in Appendix M of the FSS that was prepared and approved by the Navy that concludes the presence of approximately 20 picoCuries per gram (pCi/g) of Po-210, a daughter product of Radon-222 (Rn-222) is due entirely to environmental/naturally occurring radon (daughter product of Ra-226) in the environment. However, the information provided in the Appendix M memo does not present adequate evidence that Po-210 on the Ship Berth Bollards is not due in any part to Ra-226 contamination at the site. Ra-226 is a known contaminant at the Hunter's Point Naval Shipyard (HPNS), and it is documented that Ra-226 devices were used on the ships, discarded from the ships, and are present in the dredged bottoms that make up the shoreline at the HPNS obtained from the Ship Berth area. For example, it is possible that the bollards were painted originally with radium-containing paint that subsequently wore off or was removed from the bollards. Further, the Historical Radiological Assessment (HRA) indicates that Operation Crossroads ships docked at this area were contaminated and that other sources of contamination may have been present due to the NRDL operations. It is therefore unclear how the Memorandum or the FSS can conclude that elevated levels of Ra-226 in and around the Ship Berths did not contribute to the elevated levels of Po-210 present on the Ship Berth Structures.

- Since the naturally occurring background for Ra-226 in the vicinity was determined to be 0.375 pCi/g, it is not clear that sufficient naturally occurring Ra-226 is present to produce sufficient Rn-222 at levels that would result in removable surface contamination of approximately 20 pCi/g on the bollards and other metal surfaces, particularly given the windy conditions that are typical at Hunters Point. It appears likely that most Rn-222 would be blown away from the Ship Berths. To support the speculation that Po-210 could be due to naturally occurring Rn-222, additional investigation or sampling appears to be necessary to support the conclusions regarding the source of the elevated gross alpha/Po-210 activity.

Also, given the site history involving the use and known release of hazardous and radioactive substances at the HPNS, areas with elevated gross alpha activity above the Record of Decision (ROD) release criteria that may be related to site activities involving Radionuclides of Concern (ROCs), should be remediated. All areas within the HPNS that have metal structures that may potentially contain elevated concentrations of Po-210 (e.g., Ship Berths and other metal structures along the Parcels B and C shorelines) should be investigated for elevated radioactivity. Please revise the FSS to provide information about the surveys of other Ship Berths structures. Please also clarify if the sample was placed in a sealed container and counted after a 21-day in-growth time and discuss how the instrumentation was calibrated to account for the complex matrix/geometry of the sample for the gamma spectroscopy analysis. Please discuss how the sample was prepared for the alpha spectroscopy analysis. Please also revise the FSS to discuss the issue regarding the relationship between background concentrations of radium-226, the concentration of Rn-222 in ambient air in the vicinity of the Ship Berths, and to provide justification for the supposition that Po-210 is due to naturally occurring Rn-222. Finally, please ensure that the potential for elevated gross alpha measurements at Ship Berths and other shoreline structures along the Parcels B and C shorelines is evaluated.

2. The text in Section 1.4 (Deviations from Planning Documents) states that a concrete reference area identified in the Task-Specific Plan (TSP) was not used. Instead, an area adjacent to Building 400 was used to establish a reference material background for concrete. However, the text does not state why a new reference background area for concrete was selected rather than using the one specified in the TSP. Further, the FSS indicates in Section 5.6 (Surveys of Remaining Ship Berth Structures) that multiple types of surfaces were scanned for radioactivity (i.e., bollards and cleats) with unknown composition but does not state how background locations were selected for these other structures/matrices to ensure the gross alpha/beta and gamma scans provided representative and defensible data. Please revise the FSS to explain why the reference area for concrete was changed. Also, please revise the FSS to discuss the locations of the background areas that were utilized for other surfaces and to explain how these areas were selected.

3. FSS Exhibit 13, Sample Analytical Results Summary, does not provide the counting or total propagated uncertainties associated with the isotopic radionuclide results. Further, the text does not state whether any of the results had any associated qualifiers from data validation. In order to assess fully the validity and usability of the reported results, this information should be included in the FSS. For completeness and clarity, please revise the tables to include the uncertainty and revise the table and/or text to discuss whether any of the results had any associated qualifiers from the data validation.

4. Appendix A, Final Task-Specific Plan Radiological Survey and Release of Ship Berths 14, 21, 22, and 29, Section 2.2 (Final Status Survey) states "[W]hen results indicate concentrations of Sr-90 above the release criterion, the sample will be analyzed using alpha spectroscopy for Pu-239 only. In addition, 10 percent of the samples will be randomly chosen for analysis of strontium (and Pu-239 as needed) using the above

criteria. The number of samples required for analysis of strontium (and Pu-239 as needed) may be increased at the direction of RASO, based on an evaluation of the gamma spectroscopy results from each survey unit." While it is understood that Cesium-137 (Cs-137) and Strontium-90 (Sr-90) are associated with fission of Plutonium-239 (Pu-239), the Historical Radiological Assessment indicates that Pu-239 was also obtained in pure form as sources that were used in the Naval Radiological Defense Laboratory (NRDL). Yet the text does not indicate whether any samples were analyzed by alpha spectroscopy for Pu-239 without finding exceedances of Cs-137 or Sr-90. Please revise the text in the FSS to discuss whether any samples were analyzed by alpha spectroscopy for Pu-239 without finding exceedances of Cs-137 or Sr-90.

5. As part of this review, the EPA's Preliminary Remediation Goal (PRG) calculator was accessed to estimate the potential risk posed to a resident from any one of the survey units within the Ship Berths land area. The calculator was run by inputting the highest detections of each of the radionuclides of concern (ROCs) detected at any one of the soil survey units, or the detection limit if all results were non-detect. These values included the following:

Radium-226 at 0.468 picoCuries per gram (pCi/g), which resulted from the highest detection of 0.0843 pCi/g minus the background value of 0.375 pCi/g
Cesium-137 at 0.143 pCi/g (before remediation)
Strontium-90 at 0.326 pCi/g
Pu-239 at the detection limit of 0.036 pCi/g.

The parameter inputs included the following: 1000 square meter (m^2) land area, no cover (gamma shielding), the San Francisco climate, and eliminating consideration of consumption of produce. This evaluation was conducted to determine if the highest detections of radionuclides combined would result in risk greater than 1E-04. This demonstration was intended to confirm that the provisions of the National Contingency Plan (NCP) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requiring the excess lifetime cancer risk be maintained within the 10E-04 to 10E-06 range, and the stated project release criteria were met. Based on this PRG calculator run, the total risk was estimated at 3.38E-05, which falls within the range of risk reported in the FSS obtained from the RESRAD model. It is noted that this estimate of risk was based on the results of radiological surveys and soil sample analysis results for land areas only and did not consider the elevated gross alpha activity identified on ship berth bollard structures or any other structures which may also have elevated gross alpha measurements at Ship Berths 14, 21, 22, and 29.

6. Polonium-210 is potentially an extremely hazardous material if inhaled or ingested. Elevated activity from Polonium-210 has been found on bollards at this site. Popular media have reported about the dangers of Polonium-210, so the general public may be aware of its properties. Trespassers who enter the Hunters Point Naval Shipyard could be exposed to Polonium-210. Tina Ures (Regional Water Quality Control Board) and Juanita Bacey (Department of Toxic Substances Control) conducted a site visit and found that the location of the bollards is far away from the fenced boundary of the site, so a trespasser would need to travel a relatively large distance to reach the bollards and become exposed to the Polonium-210 on the bollards. However, given the relatively high

toxicity of Polonium-210, the potential high public concern, and the relatively small scale of the bollards, it would be prudent to remove the bollards right away to avoid any possibility of contact by trespassers.